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# Manual for a Prototype Emissions Banking and Trading Recordkeeping System

American Management Systems, Inc.
Arlington, VA

Prepared for

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The manual describes a prototype recordkeeping system for use by state and local agencies that adopt an emissions banking and trading program. The manual is organized to demonstrate how the prototype would be used to record information for various types of emissions trades, and to produce various reports of use to program managers, participating firms, and other interested organizations. The documents comprising the prototype system are described and examples are provided for tracking emission reduction credits through: creation and deposit; sale or transfer; and withdrawl and use.

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Emission Reduction Allocations

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Inventory

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Regulatory Reform Staff

U.S. Environmental Protection Agency

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SPRINGFIELD, VA 22161

# MANUAL FOR A PROTOTYPE EMISSIONS BANKING AND TRADING RECORDKEEPING SYSTEM

PREPARED FOR:

EMISSIONS TRADING PROJECT, REGULATORY REFORM STAFF
U.S. ENVIRONMENTAL PROTECTION AGENCY

REPORT NO. EPA-230-04-82-002

APRIL 26, 1982

PREPARED BY: AMERICAN MANAGEMENT SYSTEMS, INC. ARLINGTON, VA
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UNDER CONTRACT 68-01-5146

The opinions, findings, recommendations and conclusions expressed are those of the authors, and not necessarily those of the U.S. Environmental Protection Agency. Mention of any product or process is not to be considered as an endorsement by the U.S. Environmental Protection Agency.

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# I. INTRODUCTION

## A. Objectives of the Prototype Recordkeeping System

This manual describes a prototype recordkeeping system for use by state and local agencies that adopt an emissions banking and trading program. The manual identifies the recordkeeping needed to operate a banking and trading program, and can assist agencies in estimating the resources required to administer this type of program. It is a simple, easy-to-use program management and evaluation tool, designed to integrate an emissions banking and trading program into ongoing agency operations.

Emissions reduction banking and trading programs represent a voluntary extension of state and local air pollution control programs, enabling firms to receive credits for reducing their emissions below the levels required by a state implementation plan (SIP), and to sell the credits or use them for future expansion and in bubbles. These programs impose unique recordkeeping requirements on the agencies which adopt them. Certified emission reductions must be recorded to acknowledge the ownership of credits and verify their availability for future use. All trades and uses of credits must be recorded to enable agencies to preclude the duplicate use of credits and maintain the integrity of the program.

State and local agencies may use the prototype system in its current form or as the basis for a customized system. Agencies anticipating a high volume of banking and trading activity may use this prototype to design a computer-based system. However most agencies will prefer a manual recordkeeping capability.

Although the prototype is geared principally toward emissions banking programs, it is designed to maintain information about other types of emissions trades that may take place outside of the banking program, i.e., "netting", "offset" and "bubble" trades.

## B. Basic Principles and Key Features of Emission Trading Programs[1]

Emissions trading programs may be adopted by state and local air pollution control agencies to provide industry with increased flexibility in meeting pollution control goals. These programs reduce the overall cost of pollution control by enabling firms to increase controls where costs are low in exchange for equivalent relaxations in controls where costs are high. Decreases in emissions below existing limitations are reported to state and local agencies to obtain emission reduction credits (ERCs). Agencies may issue ERCs only for those reductions that are surplus, quantifiable, permanent and enforceable.

[1] A more detailed description of emissions trading is provided by several reports published by the Emissions Trading Project staff at EPA. Appendix A lists the most relevant reports and indicates how to order them.

Emission trading programs enable firms to reduce emissions and trade, use or bank the resulting ERCs. Not all emission reductions are banked for future use.

Under emission offset provisions, firms may build new sources or expand existing sources in nonattainment areas if, in addition to meeting other requirements, they obtain emission reductions from existing sources which would offset the new emissions. These reductions occur concurrently with bringing a new source on-line, or may take the form of ERCs withdrawn from an emissions bank.

Under the bubble concept, a single plant or group of plants may control their emissions as if all emission points were contained under an imaginary bubble. As long as the total emissions under the bubble have the same ambient impact as before the proposed bubble, firms may use whatever mix of controls they wish. Controls on some emission points are relaxed in exchange for tighter controls on others. In areas with a banking program, the use of banked ERCs may substitute, as part of a bubble proposal, for new tighter controls elsewhere. Also, where an emission reduction at one emission point in a bubble exceeds the emission increase at another, the difference in emissions may be banked for future use.

Through the use of emissions netting, an existing pollution source which is expanding would not be subject to New Source Review if the source compensates for added emissions by reducing the pollution from existing components. In areas with a banking program, the reduction may take the form of ERCs banked previously by the same source.

Each emissions trade must be approved by a state and/or local air pollution control agency. Trades often must be submitted to EPA for final approval. Where EPA has approved a "generic rule" for emissions trading as a SIP revision, individual trades addressed by the rule need not be submitted to EPA for approval.

The forms and recordkeeping procedures in this manual are particularly applicable to states developing generic trading rules. In adopting these trading rules, states will also have to establish administrative procedures. These procedures must include application forms for industry to use, internal agency review procedures, and tracking or recordkeeping capabilities. This brochure provides state agencies with a useful starting point for examining each of these requirements for a workable trading system.

Emission trading activities and rules will differ among state and local agencies with respect to policies and procedures for creating, banking and using ERCs. Some of the principal policy decisions include: expiration of banked ERCs after a designated period of time; restrictions on use of certain types of ERCs (e.g., ERCs resulting from plant shutdowns or reduced operating hours); adjustment of banked ERCs to reflect more stringent emission limitations needed to reach attainment; and adjustments of banked ERCs for noncompliance by the source which created them. This prototype system provides a recordkeeping capability that responds to each of these policy issues.

## C. Organization of this Manual

This manual is organized to demonstrate how the prototype would be used to record information for various types of emissions trades, and to produce various reports of use to program managers, participating firms, and other interested organizations. The discussion in the following chapters emphasizes emissions banking and trading. However, information for emissions trades not involving banking can be recorded in the manual merely by viewing these trades as separate actions: (1) the crediting of an emission reduction; (2) the trading of ERCs from one firm to another; and (3) the use of ERCs for use in a bubble, offset or netting transaction -- all occurring at the same time.

Chapter II describes briefly the documents comprising the prototype system. The next three chapters demonstrate how these documents would be used to record the principal types of banking and trading transactions and to provide information in useful form to state and local program managers and participating firms. The transactions addressed are:

- o Creation and deposit of new ERCs (Chapter III);
- o Sale or transfer of ERCs (Chapter IV); and
- o Withdrawal and use of ERCs (Chapter V).

Chapter VI describes several reports that may be produced by compiling information maintained in the prototype system. These reports are designed for use by managers of emissions banking and trading programs and by industry participants. Chapter VI also describes recordkeeping procedures which reflect the effects of certain policies on banked ERCs. Chapters VII points out some key issues agencies should consider in deciding whether to implement the prototype as a manual or computer-based system.

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# II. PRINCIPAL DOCUMENTS

## A. Overview

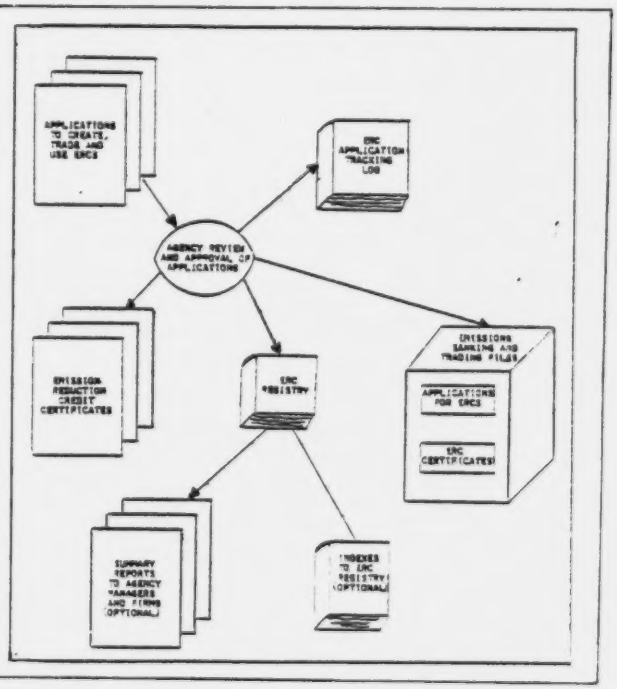
Although the prototype recordkeeping system may at first appear to be complex, it is designed to be easy to use and capable of maintaining all essential information. The prototype system consists of only a few simple documents designed to minimize the effort required to record and retrieve banking and trading information. The overall structure of the system is illustrated in Exhibit II-1, below. At the core of the system is the ERC Registry. The Registry serves as the official record for all emissions trading information. Firms use a single application form for each transaction, and are issued certificates which acknowledge the ownership of ERCs recorded in the Registry. Several optional indexes may be added to provide a capability to quickly access certain types of information stored in the Registry without reading all Registry entries.

The forms comprising the prototype recordkeeping system are:

- Application for Emission Reduction Credit;
- ERC Application Tracking Log;
- Emission Reduction Credit Certificate (Optional);
- ERC Registry;
- Indexes (Optional)
  - ERC Depositor Directory;
  - ERC Pollutant Index; and
  - ERC Trade Log.

The contents and use of these forms are described briefly in the following sections.

EXHIBIT II-1
OVERVIEW OF EMISSIONS BANKING
AND TRADING RECORDKEEPING SYSTEM


APPLICATIONS TO CREATE, TRADE AND USE ERCS
ERC APPLICATION TRACKING LOG
AGENCY REVIEW AND APPROVAL OF APPLICATIONS
EMISSION REDUCTION CREDIT CERTIFICATES
ERC REGISTRY
EMISSIONS BANKING AND TRADING FILES
APPLICATIONS FOR ERCS
ERC CERTIFICATES
SUMMARY REPORTS TO AGENCY MANAGERS AND FIRMS (OPTIONAL)
INDEXES TO ERC REGISTRY (OPTIONAL)

## B. Application Form for Emission Reduction Credits

Efficient processing of requests by firms to receive credit for emission reductions can be accomplished through the use of a standardized application form. This form provides the information required to assess the acceptability of the reported or potential reduction for credit. This same form enables a firm to report the sale or transfer of ERCs. By using a single form to report all transactions which result in a firm obtaining ERCs, the reporting process will be relatively simple. The comprehensive application form will also enable firms to report the concurrent creation of an emission reduction and trade of the resulting ERC to another firm.

The application form has three parts. Firms seeking credit for an emission reduction would complete Parts I and II of the application. Part I captures basic identification information about the firm and the specific source of the emission reduction. Part II captures detailed technical information about the reduction, including existing and proposed operating rates and level of emissions for the emissions source.[1] Part III captures information about the sale of an ERC or transfer from one firm to another. Agencies should modify the application form to reflect the requirements to obtain or trade ERCs in their program.

Firms seeking to withdraw ERCs from the emissions bank for use in bubbles, offsets, or netting would not use this application form. These types of emissions trades require the issuance or revision of source permits. It is recommended that agencies use or modify existing permit processing procedures to review applications for offsets, netting or bubbles in order to integrate this activity with current permit program operations. Chapter V explains how existing application forms used by firms to request new or revised construction or operating permits may be revised to record the use of ERCs.

---

[1] Items 15 through 39 capture detailed information about emissions, process inputs and production rates to enable the agency to determine the emission baseline and actual size of the reduction, as well as to assess its enforceability. For any application, state agencies may determine that information for several of these items may not be necessary, or additional information about production process parameters, fuel composition or other factors may be needed and should be reported by the firm on supplementary pages.

(Agency Name)

Agency Logo

# APPLICATION FOR EMISSION REDUCTION CREDIT

1. Type of Applic. (Check one)
   - ☐ Request for credit of an emission reduction. (Please complete Parts I and II.)
   - ☐ Notification of trade of emission reduction credits. (Please complete Part I for seller and Part III for buyer.)

## PART I: COMPANY AND PLANT IDENTIFICATION

2. Company Name _____
3. Mailing Address _____
4. Plant Name _____
5. Plant Location _____
6. UTM Coordinates _____

FOR AGENCY USE ONLY

Date Rec'd _____
Disposition ☐ Approved ☐ Rejected
Disposition Date _____
Certificate Nos. _____

## PART II: REQUEST FOR CREDIT OF AN EMISSION REDUCTION

7. Emission Point or Process _____
8. Type of Business _____
9. Current Permit No. _____
10. Pollutants for Which Credit is Requested (Check one)
    - ☐ Total Suspended Particulates
    - ☐ Sulfur Dioxide
    - ☐ Volatile Organic Cmpds.
    - ☐ Carbon Monoxide
    - ☐ Other: _____
11. Action Creating Reduction (Check one)
    - ☐ Installation of Control Equ.
    - ☐ Fuel Switch
    - ☐ Process Change
    - ☐ Curtailment of Operations
    - ☐ Plant Shutdown
    - ☐ Other: _____
12. Describe Action Creating Reduction (use additional pages as needed):
    _____
    _____
    _____
    _____
13. Previous Emission Controls _____
14. Emission Point Engineering (a) Stack Height _____ (b) Diameter _____ (c) Plume Temp. _____ (d) Velocity _____ (e) Particle Size _____

PART II CONTINUES ON PAGE 2.

I, the undersigned, do hereby certify that the information contained in this application and any accompanying data described herein is, to the best of my knowledge, accurate and complete.

49. Signature _____ 50. Date _____
51. Company Official & Title _____ 52. Telephone _____

PART II: REQUEST FOR CREDIT OF AN EMISSION REDUCTION (CONTINUED)

PAGE 2

## CURRENT OPERATING RATES

## PROPOSED OPERATING RATES

### 15-22 EMISSIONS

| | 15. Pollutant | 16. Rated Capacity | | 17. Allowable | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Annual | Hourly | Annual | Hourly | Annual | Hourly | * |
| (a) | | | | | | | | |
| (b) | | | | | | | | |
| (c) | | | | | | | | |
| (d) | | | | | | | | |
| (e) | | | | | | | | |
| (f) | | | | | | | | |
| (g) | | | | | | | | |
| | 22. Unit of Measure | | | | | | | |

| 19. Rated Capacity | | 20. Allowable | | 21. Actual | | |
|---|---|---|---|---|---|---|
| Annual | Hourly | Annual | Hourly | Annual | Hourly | * |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

(*Check only if seasonal variation, and describe at bottom of page.)

### 23-30 RAW MATERIALS & FUELS

| | 23. Material or Fuel | 24. Design Capacity | | 25. Permit Limitation | | 26. Actual | | |
|---|---|---|---|---|---|---|---|---|
| | | Annual | Hourly | Annual | Hourly | Annual | Hourly | |
| (a) | | | | | | | | |
| (b) | | | | | | | | |
| (c) | | | | | | | | |
| (d) | | | | | | | | |
| (e) | | | | | | | | |
| (f) | | | | | | | | |
| (g) | | | | | | | | |
| | 30. Unit of Measure | | | | | | | |

| 27. Design Capacity | | 28. Permit Limitation | | 29. Actual | | |
|---|---|---|---|---|---|---|
| Annual | Hourly | Annual | Hourly | Annual | Hourly | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

### 31-38 PRODUCTS

| | 31. Product | 32. Design Capacity | | 33. Permit Limitation | | 34. Actual | | |
|---|---|---|---|---|---|---|---|---|
| | | Annual | Hourly | Annual | Hourly | Annual | Hourly | |
| (a) | | | | | | | | |
| (b) | | | | | | | | |
| (c) | | | | | | | | |
| (d) | | | | | | | | |
| (e) | | | | | | | | |
| (f) | | | | | | | | |
| (g) | | | | | | | | |
| | 38. Unit of Measure | | | | | | | |

| 35. Design Capacity | | 36. Permit Limitation | | 37. Actual | | |
|---|---|---|---|---|---|---|
| Annual | Hourly | Annual | Hourly | Annual | Hourly | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

19. Describe Seasonal Variation (use additional pages as needed)

## PART III: NOTIFICATION OF TRADE OF EMISSION REDUCTION CREDITS

40. Company Name, Buyer _____

41. Mailing Address _____

_____

42. Company Official & Title _____ _____ 43. Telephone _____

44. Certificate No. & Date for Traded Credits _____ 45. _____

46. Pollutant _____

47. Amount of Credits _____

48. Price or Other Consideration Paid by Buyer _____

_____

_____

_____

ATTACHMENTS: Please attach a fully executed copy of the Trade Agreement, or a notarized letter signed by both Buyer and Seller identifying the Emission Reduction Credits traded. Also, please attach a copy of the Seller's current Emission Reduction Credit Certificate for the traded credits.

C. ERC Application Tracking Log

Applications to receive credit for an emission reduction or to use an ERC in a bubble, offset or for netting will undergo thorough review by an agency before they are approved. The tracking log serves to record all applications to receive credit for an emission reduction as well as to trade and use existing ERCs. The primary function of this log is to monitor agency progress in processing all ERC transactions. The log provides for tracking of the most common processing steps. Agencies should add or delete specific tracking milestones as necessary to reflect their individual review processes and management needs. This tracking log may be combined with or replaced by permit application tracking logs currently used by state and local agencies. When using a combined log, agencies should be sure to record the identification number of all Emission Reduction Credit Certificates issued for each application.

# ERC APPLICATION TRACKING LOG

1. Source Name _____
2. Source Address _____
3. Application Type _____
4. Point or Process _____
5. Agency Official _____
6. Additional Information Requested _____
7. Decision _____
8. Certificate Nos. _____

## POLLUTANTS

| TRACKING MILESTONES | ***** | ***** | ***** |
|---|---|---|---|
| 9. Date Received | | | |
| 10. Date Applic. Complete | | | |
| 11. Public Comments or Internal Review | | | |
| 12. Closing Date For Comments | | | |
| 13. Date Sent to EPA* | | | |
| 14. Date EPA Response Rec'd* | | | |
| 15. Fee Billed ($) | | | |
| 16. Date Fee Billed | | | |
| 17. Date Fee Paid | | | |
| 18. Date Action Taken | | | |

*-Emission trade approved as SIP revision.

D. Emission Reduction Credit Certificate (Optional)

The emission reduction credit certificate serves several purposes. It notifies the firm that an emission reduction has been credited. For emission reductions encompassing several creditable pollutants, a certificate is issued for each pollutant. Certificates would be issued to confirm the balance of an ERC remaining in the emissions bank after a part of the original ERC is traded or withdrawn for use. Certificates are issued to purchasers of ERCs as well. It should be noted that a certificate is intended to have no legal significance. Possession of a certificate does not confirm the ownership of any ERCs, nor must certificates be presented to the state agency before a transaction can be approved. Only entries recorded in the ERC Registry serve to confirm the ownership of ERCs. Agencies may choose not to issue certificates and instead use copies of ERC Registry entries to inform firms of the approval of banking and trading transactions.

Agency Logo

[*Agency Name*]

## EMISSION REDUCTION CREDIT CERTIFICATE

Issued to _____ Certificate No. _____
Address _____ Date Issued _____
_____
_____ Pollutant _____
Emission Credit _____ Tons per Yr.
For Source _____
Location _____ Permit Reference _____
_____ Point or Process _____
_____
Expiration _____

This certificate represents ownership of the above amount of emission reduction credits for the specified pollutant. The emission reduction was confirmed by [*Agency Name*]. See Permit [*permit reference number*]. Subject to the rules established by [*Agency Name*] for emission reduction credit banking and use, these credits may be used to meet requirements for a new source permit or to comply with emissions limits required in the [*State Name*] State Implementation Plan. Use of some or all of these credits to satisfy permit requirements is subject to the approval of [*Agency Name*] according to its rules, and is subject to the following specific restriction(s):

_____
_____
_____
_____

All emission reduction credits are subject to pro rata adjustment in the event of changes in national ambient air quality standards or modification of the State Implementation Plan. No credits may be transferred without the express approval of [*Agency Name*].

[*Official Signature*] [*Official Signature*]
[*Name and Title*] [*Name and Title*]

FOR AGENCY USE ONLY

ERC Registry Page _____ ERCs of _____ TPY [ ] Sold
ERC Balance Forwarded [ ] Used on _____
from Cert. No. _____ Certificate No. _____ Issued for Balance
Certificate No. _____ Issued to Buyer

## E. ERC Registry

The ERC Registry is the prime repository of information for all emissions banking activity. The Registry consists of several sections. It identifies original and any subsequent holders of each ERC. It also identifies all previous trades, uses and adjustments of an ERC, and the current balance of an ERC available for use. Each Registry page corresponds to a single ERC or certificate. For example, a firm holding three ERCs of 100 tons each of particulates, hydrocarbons and sulfur dioxide will have entries on three Registry pages. When an ERC is traded by a firm to one or more other firms, the ownership of each part of the original ERC is recorded on a separate page.

AGENCY LOGO

# ERC REGISTRY

Page _____

## OWNERSHIP

Certificate No. _____ Date _____

Owner Name _____

Address _____

_____

_____

Contact _____

Telephone _____

Original Owner ☐ Purchased ERCs ☐

## ERC ATTRIBUTES

ERCs Issued _____ (TPY)
(See current balance below)

Pollutant _____

AQCR _____

Expiration _____

## ORIGINAL REDUCTION

Cert. No. _____ Date _____ Particle Size _____

Source Name _____

Address _____ Stack: Height _____

_____ Diam. _____

UTM ____ PSD or NA ____ Plume: Temp. _____

Permit No. _____

*Red. Date* _____ Velocity _____

Red. Method _____

_____

Hazardous Pollutants _____ Other _____

Seasonal Variation _____

## ERC USAGE AND TRADES

| DATE | TYPE OF TRADE | PERMIT NUMBER | CERTIFICATE NUMBER FOR TRADED ERCs | COMMENTS | EMISSIONS INCREASE (TPY) | ADJUSTMENT RATIO OR % | ERCs WITHDRAWN (TPY) | BALANCE (TPY) | CERTIFICATE NUMBER FOR BALANCE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
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F. ERC Depositor Directory (Optional)

This Directory is one of three optional indexes designed to provide easy access to information stored in the Registry. The Directory enables an agency to identify quickly all ERCs owned by a particular source or a parent company with a controlling interest in several sources. It also enables each firm to readily identify its total ERC holdings. Certificate numbers listed in the Directory serve as a reference to the corresponding entries in the ERC Registry. Each page of the Directory lists the certificates for a single source. Information regarding the quantity of ERCs held by a firm is not recorded in the Directory to avoid the need to update quantity data both in the Directory and in the ERC Registry whenever a trade takes place. For ease of use, the Directory pages should be sorted alphabetically by parent company and source name.

## ERC DEPOSITOR DIRECTORY

SOURCE CODE _____ PARENT COMPANY _____

NAME _____

ADDRESS _____ ADDRESS _____

_____ _____

_____ _____

CONTACT _____ CONTACT _____

TELEPHONE _____ TELEPHONE _____

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED |
|---|---|---|---|---|---|
| NUMBER | DATE | | NUMBER | DATE | |
| | | | | | |

G. ERC Pollutant Index (Optional)

The Pollutant Index is designed to enable an agency to quickly identify all ERCs available for use for a particular pollutant. The index can be used by Agencies in evaluating the effect of banked ERCs for a particular pollutant on its reasonable further progress and attainment strategies. It also provides a simple means of identifying potential sources of ERCs for interested purchasers. Certificate numbers listed for a specific pollutant serve as a reference to the corresponding entries in the ERC Registry.

## ERC POLLUTANT INDEX

POLLUTANT _____

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | SOURCE NAME |
|---|---|---|---|
| NUMBER | DATE | | |
| | | | |

## H. ERC Trade Log (Optional)

Some emissions trading programs may collect information which they wish to treat as confidential business information. For example, an agency may collect information on the price of traded ERCs, but may elect to disclose this information in only certain situations. Price information will enable an agency to estimate part of the potential savings of ERC trading to firms in its state and track changes in the price of ERCs. An ERC Trade Log is intended to record the price of traded ERCs.

The ERC Registry is designed to contain no proprietary or sensitive information and is intended to be made available to potential buyers of ERCs. As a result, financial or other confidential information for ERC trades is recorded in a secure internal log and not in the public Registry. Of course, agencies may want to make ERC prices public, and may easily do so by recording them in the ERC Registry.

ERC TRADE LOG

| TRADE DATE | SELLER'S CERTIFICATE | BUYER'S CERTIFICATE | POLLUTANT | VOLUME (TPY) | PRICE ($) |
|---|---|---|---|---|---|
| | | | | | |

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# III. RECORDKEEPING FOR NEW DEPOSITS OF ERCS

## A. Overview

The prototype system provides state and local agencies the capability to monitor the receipt of applications for ERCs and to record the ultimate disposition of all applications. Firms apply for ERCs by completing Parts I and II of the standard application form. After the state or local agency receives the application, it must perform the following recordkeeping tasks:

- o Log the receipt of the application;
- o Record progress in processing the application;
- o Issue a certificate for approved ERCs, or issue denial letter if necessary;
- o Record the ERCs in the ERC Registry; and
- o Record the issuances of new ERCs in appropriate indexes

These tasks are described in the following sections.

## B. Logging Receipt of an Application for an Emission Reduction Credit

Each application to obtain credit for creating and banking an emission reduction is entered into the ERC Application Tracking Log as soon as it is received by the agency. The Log will serve to monitor progress in processing each application. It also provides a historical record of the ultimate disposition of all applications. Exhibit III-1 illustrates how the Log is used to record an application for creating and banking an emission reduction.

## C. Recording Progress in Processing Applications

Each of the major milestones in processing an application for creating and banking ERCs is recorded in the Log after it occurs. Anticipated milestone dates may be recorded, but should be designated by an asterisk or other symbol to distinguish them from milestones that have already been achieved. If additional information is required to evaluate the application, the date of request is entered in item #6. The use of application fees is an option for states. If fees are adopted, then billing and collection should be recorded in the Tracking Log as well as in agency accounting systems.

Some applications may address more than one pollutant. In these cases, the Tracking Log enables the agency to monitor the progress for each pollutant separately, if necessary, due to modeling or monitoring requirements, the need for EPA to review trades for pollutants not addressed by "generic" emissions trading rules, or for other reasons.

After the application is approved, the identification number of the resulting certificates are recorded in the Log to provide a permanent cross-reference between the initial application containing technical information about the emission reduction and all subsequent emissions banking and trading transactions. Exhibit III-2 illustrates the completed entry for the Clean-Products, Inc. application, and includes references to two certificates resulting from this application: one for TSP reductions and another for $SO_2$ reductions.

## D. Issuing Certificates for New ERCs or Denial Letters

### 1. Issuing Certificates for New ERCs

An Emission Reduction Credit Certificate may be issued for each pollutant for which ERCs are approved by the state or local agency. As illustrated in Exhibit III-3 the certificate contains only basic descriptive information about the reduction and resulting ERCs. More detailed information will be recorded in the ERC Registry. Note that the Registry page corresponding to each certificate is recorded at the bottom of the certificate. When issuing certificates for new reductions, agencies should number them sequentially and include the current year as part of the certificate number. In the example for Clean-Products, Inc., certificates 81-0001 and 81-0002 are issued.[1] Exhibit III-3 illustrates the certificate issued for the TSP reduction. A copy of all certificates should be retained by the agency to aid the preparation of revised certificates, to enable the agency to issue duplicate or replacement certificates if necessary, and for any other recordkeeping purposes.

### 2. Issuing Denial Letters for Unqualified Reductions

Some emission reductions submitted for credit will not be approved, or credit will be issued for only part of the reduction claimed. These situations should be communicated in writing to the applicant and recorded in the Tracking Log under item #7. By maintaining complete records for both approved and rejected applications, an agency will have available a valuable data base for systematically identifying potential problems or deficiencies of its banking and trading program.

## E. Recording New ERCs in the ERC Registry

Each certificate for new ERCs is recorded in the ERC Registry. As illustrated in Exhibit III-4, the top portion of the Registry page is partially completed with information from the application form and the certificate. The amount of the credit is recorded in the "Balance" column of the bottom half of

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[1] This prototype system utilizes a compound certificate number. The first segment denotes the year of issuance and the second segment represents a simple count of certificates.

the Registry page. The reference number for the revised construction or operating permit and the certificate number are also recorded in the Registry. These items of information provide vital links to other documents in the agency's permit system and the ERC recordkeeping system, respectively.

Many agencies will revise a source's existing construction or operating permit concurrently with issuing the certificate in order to specify the terms of the emission reduction as a condition of the permit. The prototype system provides several points of cross-reference to the permit. The ERC Certificate includes a "permit reference" item which indicates to the firm the permit associated with the emission reduction indicated by the certificate. The ERC Registry records the same "permit reference number" to enable the agency to crosswalk from the reductions recorded in the Registry to the new or revised permits recorded in the agency's permit system.[1]

In the example for Clean Products, Inc., two new pages would be added to the Registry. Exhibit III-4 illustrates the entry for certificate number 81-0001 only. Certificate number 81-0002 would be recorded on a separate page of the Registry.

F. Recording the Issuance of New ERCs in Appropriate Indexes

Whenever an agency issues new ERCs, several of the indexes of the recordkeeping system should be updated. If the firm issued ERCs has never participated in the emissions trading program, it should be recorded in the Depositor Directory as illustrated in Exhibit III-5. If the firm has participated previously and appears in the Directory, the new certificates should be recorded on the appropriate page.

The issuance of new ERCs also should be recorded in the Pollutant Index. Exhibit III-6 illustrates the entry for certificate number 81-0001 for TSP ERCs issued to Clean Products, Inc. The issuance of other certificates for TSP ERCs to other firms would be recorded on the same page of this index.

All ERCs created or banked should be recorded in the appropriate indexes. Failure to do so will significantly degrade the reliability of the indexes for identifying all certificates issued to a particular firm or for specific pollutants, and require agency staff to search the entire Registry to obtain equivalent information.

G. Recordkeeping Variations Associated With Particular Policy Options

Two optional emissions banking policies may, if adopted, require specific additional entries in the system at the time an ERC is issued by the agency.

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[1] In some agencies, a consent decree or administrative order would serve the same purpose as the operating permit and should be recorded in the recordkeeping system using the ERC Registry.

1. Restrictions on Uses of ERCs

State and local agencies may elect to impose restrictions on the use of certain types of ERCs. For example, ERCs resulting from plant shutdowns may be limited to use only by the firm which created them. In these cases, the Emission Reduction Credit Certificate should provide for the entry of restrictions on uses of ERCs. Although restrictions would be specified in the agency's emissions trading rule or regulations, listing applicable restrictions on the certificate would provide better notice and assist firms in evaluating potential uses of their ERCs.

2. ERC Expiration

Some agencies may require that ERCs not used within a designated period of time be forfeited to the agency, cancelled, or subjected to a mandatory sale. Both the certificate and Registry record the expiration date for ERCs. The Registry entry enables the agency to identify the imminent expiration of ERCs and notify affected firms.

EXHIBIT III-1
RECORDING RECEIPT OF AN APPLICATION

# ERC APPLICATION TRACKING LOG

1. Source Name: Clean Products, Inc.
2. Source Address: 1234 Industrial Park Dr. Washington, DC 20460
3. Application Type: Bank new ERCs
4. Point or Process: #2 Coal-fired boiler
5. Agency Official: S. Smith
6. Additional Information Requested:
7. Decision:
8. Certificate Nos.:

## POLLUTANTS

| TRACKING MILESTONES | TSP | $SO_2$ |
|---|---|---|
| 9. Date Received | 1/18/81 | 1/18/81 |
| 10. Date Applic. Complete | | |
| 11. Public Comments or Internal Review | | |
| 12. Closing Date For Comments | | |
| 13. Date Sent to EPA* | | |
| 14. Date EPA Response Rec'd * | | |
| 15. Fee Billed ($) | | |
| 16. Date Fee Billed | | |
| 17. Date Fee Paid | | |
| 18. Date Action Taken | | |

*-Emission trade approved as SIP revision.

EXHIBIT III-2

TRACKING PROCESSING OF APPLICATION AND ISSUANCE OF CERTIFICATES

# ERC APPLICATION TRACKING LOG

| | | | | |
|---|---|---|---|---|
| 1. | Source Name | Clean Products, Inc. | 7. Decision | ERCs issued - TSP and $SO_2$ |
| 2. | Source Address | 1234 Industrial Park Dr. Washington, DC 20460 | 8. Certificate No. | 81-0001<br>81-0002 |
| 3. | Application Type | Bank new ERCs | | |
| 4. | Point or Process | #2 Coal-fired boiler | | |
| 5. | Agency Official | S. Smith | | |
| 6. | Additional Information Requested | Stack test data-requested 1/14/81 | | |

## POLLUTANTS

| TRACKING MILESTONES | TSP | $SO_2$ |
|---|---|---|
| 9. Date Received | 1/18/81 | 1/18/81 |
| 10. Date Applic. Complete | 2/3/81 | 2/3/81 |
| 11. Public Comments or Internal Review | Public comments | Public comments |
| 12. Closing Date For Comments | 2/24/81 | 2/24/81 |
| 13. Date Sent to EPA* | 3/3/81 | 3/3/81 |
| 14. Date EPA Response Rec'd * | 4/15/81 | 4/15/81 |
| 15. Fee Billed ($) | $50.00 | $50.00 |
| 16. Date Fee Billed | 1/9/81 | 1/9/81 |
| 17. Date Fee Paid | 1/23/81 | 1/23/81 |
| 18. Date Action Taken | 4/30/81 | 4/30/81 |

*-Emission trade approved as SIP revision.

EXHIBIT III-3

CERTIFICATE FOR ERC RESULTING FROM NEW REDUCTION

Agency Logo

[*Agency Name*]

## EMISSION REDUCTION CREDIT CERTIFICATE

Issued to: Clean Products, Inc.
Address: 1234 Industrial Park Drive, Washington, D.C. 20460

Certificate No. 81-0001
Date Issued April 30, 1981

Pollutant TSP
Emission Credit Fifty (50) Tons per Yr.

For Source #2 Coal-fired Boiler
Location Same as above

Permit Reference 43-0624-2
Point or Process Boiler #2

Expiration April 30, 1991

This certificate represents ownership of the above amount of emission reduction credits for the specified pollutant. The emission reduction was confirmed by [*Agency Name*]. See Permit [*permit reference number*]. Subject to the rules established by [*Agency Name*] for emission reduction credit banking and use, these credits may be used to meet requirements for a new source permit or to comply with emissions limits required in the [*State Name*] State Implementation Plan. Use of some or all of these credits to satisfy permit requirements is subject to the approval of [*Agency Name*] according to its rules, and is subject to the following specific restriction(s):

None

All emission reduction credits are subject to pro rata adjustment in the event of changes in national ambient air quality standards or modification of the State Implementation Plan. No credits may be transferred without the express approval of [*Agency Name*].

Ernest Workman

Ernest Workman
Air Pollution Control Officer

FOR AGENCY USE ONLY

ERC Registry Page 1
ERC Balance Forwarded from Cert. No. _____

ERCs of _____ TPY [ ] Sold [ ] Used on _____
Certificate No. _____ Issued for Balance
Certificate No. _____ Issued to Buyer

EXHIBIT III-4

REGISTRY ENTRY FOR ERC ISSUED FOR A NEW REDUCTION

AGENCY LOGO

# ERC REGISTRY

Page 1

## OWNERSHIP

Certificate No. 81-0001 Date April 30, 1981

Owner Name Clean Products, Inc.

Address 1234 Industrial Park Drive
Washington, D.C. 20460

Contact Mr. John Fitch

Telephone 202-999-9999

Original Owner ☒ Purchased ERCs ☐

## ERC ATTRIBUTES

ERCs Issued 50 (TPY)
(See current balance below)

Pollutant TSP

AQCR Washington, D.C. Metro

Expiration April 30, 1991

## ORIGINAL REDUCTION

Cert. No. 81-0001 Date 4/30/81 Particle Size 30 u

Source Name Same as owner

Address

Stack: Height 50 ft. Diam. 3 ft.

UTM ____ PSD or NA NA Plume: Temp.

Permit No. 43-0624-2

Red. Date 1/5/81 Velocity

Red. Method Installation of precipitator

Hazardous Pollutants None Other

Seasonal Variation None

## ERC USAGE AND TRADES

| DATE | TYPE OF TRADE | PERMIT NUMBER | CERTIFICATE NUMBER FOR TRADED ERCs | COMMENTS | EMISSIONS INCREASE (TPY) | ADJUSTMENT RATIO OR % | ERCs WITHDRAWN (TPY) | BALANCE (TPY) | CERTIFICATE NUMBER FOR BALANCE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 50 | |
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EXHIBIT III-5

## ERC DEPOSITOR DIRECTORY

SOURCE CODE _____

NAME Clean Products, Inc.

ADDRESS 1234 Industrial Park Drive
Washington, D.C. 20460

CONTACT Mr. John Fitch

TELEPHONE 202-999-9999

PARENT COMPANY Not Applicable

ADDRESS _____

CONTACT _____

TELEPHONE _____

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED |
|---|---|---|---|---|---|
| NUMBER | DATE | | NUMBER | DATE | |
| 81-0001 | 4/30/81 | | | | |
| 81-0002 | 4/30/81 | | | | |

EXHIBIT III-6

ERC POLLUTANT INDEX

POLLUTANT TSP

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | SOURCE NAME |
|---|---|---|---|
| NUMBER | DATE | | |
| 81-0001 | 4/30/81 | | Clean Products, Inc. |

# IV. RECORDKEEPING FOR SALES AND TRANSFERS OF ERCS

## A. Overview

Firms possessing ERCs may use the ERC at a source owned by the firm, or sell or transfer ownership of the ERC to another firm for use by that firm. This chapter addresses the sale or transfer of ERCs. Chapter V addresses the use of ERCs by the firm owning them.

ERCs traded between firms in many cases will be used immediately by the firm which acquires them. In these situations, the sale or transfer of the ERC should be recorded using the procedure illustrated in this chapter, and the use of the ERC in a bubble or offset should be recorded using the procedure described in Chapter V. For the concurrent sale and use of ERCs, these procedures would likewise be performed concurrently.

The prototype system provides the capability to record all sales and transfers of ERCs and maintains a trail of ownership for ERCs no matter how many times they are traded. When a firm transfers only part of an ERC, the system identifies the portion of the ERC owned by each firm, and cross-references all traded ERCs to the certificate for the original ERC.

Firms would use Parts I and III of the Application for Emission Reduction Credit to report an ERC trade to the agency. Agencies will review the application to confirm the ownership of the traded ERCs, and then perform the necessary recordkeeping tasks.

After the agency receives a firm's application to transfer ERCs, the following recordkeeping tasks are performed:

- Log the receipt of the application and record progress;
- Issue a revised certificate to the seller to reflect the transfer of ERCs;
- Update entries for seller's certificate in appropriate indexes to reflect the transfer;
- Issue a new certificate to the buyer/recipient;
- Record the buyer's/recipient's certificate in appropriate indexes; and
- Record the trade in the ERC Registry.

These tasks are described in the following sections. With the exception of the first of these tasks, all tasks should be performed concurrently.

B. Logging the Receipt of Trading Applications and Recording Progress

Each application to report a trade of ERCs is entered in the ERC Applications Tracking Log as soon as it is received by the agency. Progress in recording the trade and issuing new certificates is also recorded in the Log. As illustrated in Exhibit IV-1, most items in the Log are not used to track the trading of ERCs. Exhibit IV-1 presents a complete entry for the sale of particulate ERCs by Clean Products, Inc.

C. Issuing Revised Certificates to Sellers

When a firm sells only part of an existing ERC, the agency will issue a revised certificate to that firm and update the agency's copy of the previous certificate. Exhibit IV-2 illustrates the revised certificate issued to Clean Products, Inc. Note the changes to the certificate number, date and emission credit, and the "balance forward" entry on the bottom of the certificate.[1] The revised certificate is sent to the seller. Exhibit IV-3 illustrates the entries made on the previous certificate to cross reference it to the seller's revised certificate and the buyer's new certificate. The file copy of the previous certificate, and copies of the new and revised certificate issued to the buyer and seller, respectively, are retained by the agency.

When a firm sells all of an existing ERC, the agency does not issue a revised certificate. However, the agency should update and cancel the seller's current certificate to reflect the trade.

D. Updating Entries for Sellers' Certificates in Appropriate Indexes

Some agencies may treat the price of traded ERCs as confidential information. For these agencies, the sale or transfer of ERCs is recorded in the ERC Trade Log. The agency should collect and record all required information in the Registry. Exhibit IV-4 illustrates the entry for the sample trade noted above.

If a firm trades or uses all of an existing ERC, the Depositor Directory and Pollutant Index are updated to show that the appropriate certificate is no longer available for sale or use. For the sample trade noted in this chapter, Clean Products has sold only part of an ERC and no revision of these indexes is necessary.[2]

---

[1] The second portion of the certificate number is changed to reflect the re-issuance of the certificate by denoting how many times the certificate has been re-issued to the same firm (i.e., 81-0001.1).

[2] Recordkeeping for the use (or trade) of an entire ERC will be demonstrated in Chapter V.

E. Issuing New Certificates to Buyer

The buyer of an ERC is issued a certificate designating the amount and type of ERCs purchased. As illustrated in Exhibit IV-5 for the Growing Business Company, the buyer's certificate identification number differs from the number of the seller's certificate. In addition, information about the emission source need not be recorded on the certificate issued to the buyer. The certificate number and information about the emission source from which the original reduction was created will be recorded on a new page in the Registry.

F. Recording in Appropriate Indexes the ERCs Issued to Buyers

The issuance of certificates to ERC buyers should be recorded in the system in the same manner as the issuance of certificates for new emission reductions. As illustrated in Exhibit IV-6, the certificate issued to The Growing Business Company is recorded in the ERC Pollutant Index. If the purchase of ERCs by The Growing Business Company represented the first time the firm participated in the banking and trading program, the firm would be added to the Depositor Directory, as illustrated in Exhibit IV-7.

G. Recording Trades in the ERC Registry

Each trade of ERCs requires two different types of entries in the ERC Registry. The existing entry for the seller's ERC is updated to reflect the date and size of the trade, and the amount of the ERC available for further trading or use. As illustrated in Exhibit IV-8, this information is recorded in the "ERC Usage and Trades" section of the Registry page. If the ERC were entirely traded, the "balance" of the ERC would be zero.

A new page would be added to the Registry to record the ERC purchased by the buyer. As illustrated in Exhibit IV-9, the Registry entry indicates that the ERC has been traded and identifies both the current owner of the ERC and the source responsible for the emission reduction of the original ERC. The amount of the trade (i.e., 20 TPY) is entered as the starting balance for the buyer. Although the example presented shows no change in the expiration date for the ERC, some agencies may elect to recompute the expiration of traded ERCs.

EXHIBIT IV-1

RECORDING AND TRACKING AN APPLICATION TO TRADE ERCs

# ERC APPLICATION TRACKING LOG

| | | | |
|---|---|---|---|
| 1., Source Name | Clean Products, Inc. | 7. Decision | Trade Recorded for 20TPY |
| 2. Source Address | 1234 Industrial Park, Dr. Washington, D.C. 20460 | 8. Certificate Nos. | 81-0001.1 81-0003 |
| 3. Application Type | ERC Trade | | |
| 4. Point or Process | | | |
| 5. Agency Official | | | |
| 6. Additional Information Requested | None needed | | |

## POLLUTANTS

| TRACKING MILESTONES | TSP |
|---|---|
| 9. Date Received | 5/14/81 |
| 10. Date Applic. Complete | 5/14/81 |
| 11. Public Comments or Internal Review | |
| 12. Closing Date For Comments | |
| 13. Date Sent to EPA* | |
| 14. Date EPA Response Rec'd* | |
| 15. Fee Billed ($) | $25.00 |
| 16. Date Fee Billed | |
| 17. Date Fee Paid | 5/14/81 |
| 18. Date Action Taken | 5/21/81 |

*-Emission trade approved as SIP revision.

EXHIBIT IV-2

REVISED CERTIFICATE FOR ERC BALANCE

Agency Logo

[*Agency Name*]

## EMISSION REDUCTION CREDIT CERTIFICATE

Issued to: Clean Products, Inc.
Address: 1234 Industrial Park Drive
Washington, D.C. 20460

For Source: #2 Coal-fired Boiler
Location: Same as above

Certificate No. 81-0001.1
Date Issued May 21, 1981

Pollutant TSP
Emission Credit Thirty (30) Tons per Yr.

Permit Reference 43-0624-2
Point or Process Boiler #2

Expiration April 30, 1991

This certificate represents ownership of the above amount of emission reduction credits for the specified pollutant. The emission reduction was confirmed by [*Agency Name*]. See Permit [*permit reference number*]. Subject to the rules established by [*Agency Name*] for emission reduction credit banking and use, these credits may be used to meet requirements for a new source permit or to comply with emissions limits required in the [*State Name*] State Implementation Plan. Use of some or all of these credits to satisfy permit requirements is subject to the approval of [*Agency Name*] according to its rules, and is subject to the following specific restriction(s):

None

All emission reduction credits are subject to pro rata adjustment in the event of changes in national ambient air quality standards or modification of the State Implementation Plan. No credits may be transferred without the express approval of [*Agency Name*].

Ernest Workman

Ernest Workman
Air Pollution Control Officer

FOR AGENCY USE ONLY

ERC Registry Page 1
ERC Balance Forwarded from Cert. No. 81-0001

ERCs of _____ TPY [ ] Sold [ ] Used on _____
Certificate No. _____ Issued for Balance
Certificate No. _____ Issued to Buyer

EXHIBIT IV-3

UPDATE OF SELLER'S PREVIOUS CERTIFICATE
RETAINED IN AGENCY'S FILES

Agency Logo

[*Agency Name*]

## EMISSION REDUCTION CREDIT CERTIFICATE

Issued to: Clean Products, Inc.
Address: 1234 Industrial Park Drive, Washington, D.C. 20460

For Source Location: #2 Coal-fired Boiler; Same as above

Certificate No. 81-0001
Date Issued April 30, 1981

Pollutant TSP
Emission Credit Fifty (50) Tons per Yr.

Permit Reference 43-0624-2
Point or Process Boiler #2

Expiration April 30, 1991

This certificate represents ownership of the above amount of emission reduction credits for the specified pollutant. The emission reduction was confirmed by [*Agency Name*]. See Permit [*permit reference number*]. Subject to the rules established by [*Agency Name*] for emission reduction credit banking and use, these credits may be used to meet requirements for a new source permit or to comply with emissions limits required in the [*State Name*] State Implementation Plan. Use of some or all of these credits to satisfy permit requirements is subject to the approval of [*Agency Name*] according to its rules, and is subject to the following specific restriction(s):

None

All emission reduction credits are subject to pro rata adjustment in the event of changes in national ambient air quality standards or modification of the State Implementation Plan. No credits may be transferred without the express approval of [*Agency Name*].

Ernest Workman
Ernest Workman
Air Pollution Control Officer

| FOR AGENCY USE ONLY | | | |
|---|---|---|---|
| ERC Registry Page | 1 | ERCs of 20 TPY [X] Sold [ ] Used on 5/21/81 | |
| ERC Balance Forwarded from Cert. No. | | Certificate No. 81-0001.1 | Issued for Balance |
| | | Certificate No. 81-0003 | Issued to Buyer |

EXHIBIT IV-4
RECORDING A TRADE OF ERCs

ERC TRADE LOG

| TRADE DATE | SELLER'S CERTIFICATE | BUYER'S CERTIFICATE | POLLUTANT | VOLUME (TPY) | PRICE ($) |
|---|---|---|---|---|---|
| 5/21/81 | 81-0001 | 81-0003 | TSP | 20 | $43,000 |

EXHIBIT IV-5

NEW CERTIFICATE ISSUED TO ERC BUYER

Agency Logo

[*Agency Name*]

EMISSION REDUCTION CREDIT CERTIFICATE

Issued to: The Growing Business Company
Address: 999 South Capitol Street
Washington, D.C. 20003

For Source Location:

Certificate No. 81-0003
Date Issued May 21, 1981

Pollutant TSP
Emission Credit Twenty (20) Tons per Yr.

Permit Reference
Point or Process

Expiration April 30, 1991

This certificate represents ownership of the above amount of emission reduction credits for the specified pollutant. The emission reduction was confirmed by [*Agency Name*]. See Permit [*permit reference number*]. Subject to the rules established by [*Agency Name*] for emission reduction credit banking and use, these credits may be used to meet requirements for a new source permit or to comply with emissions limits required in the [*State Name*] State Implementation Plan. Use of some or all of these credits to satisfy permit requirements is subject to the approval of [*Agency Name*] according to its rules, and is subject to the following specific restriction(s):

None

All emission reduction credits are subject to pro rata adjustment in the event of changes in national ambient air quality standards or modification of the State Implementation Plan. No credits may be transferred without the express approval of [*Agency Name*].

Ernest Workman

Ernest Workman
Air Pollution Control Officer

FOR AGENCY USE ONLY

ERC Registry Page 3
ERC Balance Forwarded from Cert. No.

ERCs of TPY
Certificate No.
Certificate No.

[ ] Sold
[ ] Used on
Issued for Balance
Issued to Buyer

EXHIBIT IV-6

## ERC POLLUTANT INDEX

POLLUTANT TSP

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | SOURCE NAME |
|---|---|---|---|
| NUMBER | DATE | | |
| 81-0001 | 4/30/81 | | Clean Products, Inc. |
| 81-0003 | 5/21/81 | | The Growing Business Company |

EXHIBIT IV-7

## ERC DEPOSITOR DIRECTORY

SOURCE CODE _____

NAME The Growing Business Company

ADDRESS 999 South Capitol Street
Washington, D.C. 20003

CONTACT J. Pierce

TELEPHONE 202-777-7777

PARENT COMPANY Not Applicable

ADDRESS _____

CONTACT _____

TELEPHONE _____

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED |
|---|---|---|---|---|---|
| NUMBER | DATE | | NUMBER | DATE | |
| 81-0003 | 5/21/81 | | | | |

AGENCY LOGO

# ERC REGISTRY

Page 1

## OWNERSHIP

Certificate No. 81-0001 Date April 30, 1981

Owner Name Clean Products, Inc.
Address 1234 Industrial Park Drive
Washington, D.C. 20460

Contact Mr. John Fitch
Telephone 202-999-9999

Original Owner [X] Purchased ERCs [ ]

## ERC ATTRIBUTES

ERCs Issued 50 (TPY)
(See current balance below)

Pollutant TSP
AQCR Washington, D.C. Metro
Expiration April 30, 1991

## ORIGINAL REDUCTION

Cert. No. 81-0001 Date 4/30/81
Source Name Same as owner
Address

UTM ___ PSD or NA NA
Permit No. 43-0624-2
Red. Date 1/5/81
Red. Method Installation of precipitator

Particle Size 30 u
Stack: Height 50 ft.
Diam. 3 ft.
Plume: Temp.
Velocity

Hazardous Pollutants None Other
Seasonal Variation None

## ERC USAGE AND TRADES

| DATE | TYPE OF TRADE | PERMIT NUMBER | CERTIFICATE NUMBER FOR TRADED ERCs | COMMENTS | EMISSIONS INCREASE (TPY) | ADJUSTMENT RATIO OR % | ERCs WITHDRAWN (TPY) | BALANCE (TPY) 50 | CERTIFICATE NUMBER FOR BALANCE |
|---|---|---|---|---|---|---|---|---|---|
| 5/21/81 | Sale | | 81-0003 | Price $400 per TPY | | | 20 | 30 | 81-0001.1 |
| | | | | | | | | | |
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EXHIBIT IV-8

RECORDING THE TRADE OF ERCs BY SELLER

AGENCY LOGO

# ERC REGISTRY

Page 3

## OWNERSHIP

Certificate No. 81-0003 Date May 21, 1981

Owner Name The Growing Business Company
Address 999 South Capitol Street
Washington, D.C. 20003

Contact J. Pierce
Telephone 202-777-7777

Original Owner ☐ Purchased ERCs ☒

## ERC ATTRIBUTES

ERCs issued 20 (TPY)
(See current balance below)

Pollutant TSP
AQCR Washington, D.C. Metro
Expiration April 30, 1991

## ORIGINAL REDUCTION

Cert. No. 81-0001 Date 4/30/81 Particle Size 30 u
Source Name Clean Products Inc.
Address 1234 Industrial Park, Dr. Stack: Height 50 ft.
Washington, D.C. 20460 Diam. 3 ft.

UTM ____ PSD or NA NA Plume: Temp. ____
Permit No. 43-0624-2
Red. Date 1/5/81 Velocity ____
Red. Method Installation of precipitator

Hazardous Pollutants None Other ____
Seasonal Variation None

## ERC USAGE AND TRADES

| DATE | TYPE OF TRADE | PERMIT NUMBER | CERTIFICATE NUMBER FOR TRADED ERCs | COMMENTS | EMISSIONS INCREASE (TPY) | ADJUSTMENT RATIO OR % | ERCs WITHDRAWN (TPY) | BALANCE (TPY) 20 | CERTIFICATE NUMBER FOR BALANCE |
|---|---|---|---|---|---|---|---|---|---|
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EXHIBIT IV-9
RECORDING THE ACQUISITION OF ERCs BY BUYER

# V. RECORDKEEPING FOR USES OF ERCS

## A. Overview

The prototype system provides the capability to record the three potential uses of ERCs: netting, bubbles and offsets. It can record the use of part of an ERC, or the use of one or more ERCs in any of these transactions. The system can be used for ERCs that are used at the time they are created and therefore are not stored in a bank, or it can track ERCs used from a bank. Finally, the system, can be used for trades occuring as SIP revision or under state generic emissions trading rules.

In proposing an offset or bubble, a firm may propose to use its own ERCs or ERCs owned by another firm that it has negotiated the right to use. In recording emissions trades involving the use by one firm of ERCs previously owned by another, the agency should record two distinct transactions: the sale or transfer of the ERC(s), and the subsequent use of the traded ERC(s). Chapter IV described the recordkeeping procedures for the sale or transfer of ERCs.

As noted in Chapter II, the prototype system provides no standard application form for proposed uses of ERCs. Agencies are encouraged to use or modify existing permit application forms for this purpose. These forms should be certain to include the following information for each ERC:

- o Certificate number and date of the ERCs proposed for use; and
- o The amount of ERCs proposed for use.

After the agency receives the ERC use application, it should perform the following recordkeeping tasks:

- o Log the receipt of the application and record progress;
- o Issue a revised certificate for unused portion of ERC;
- o Update entries for revised certificate in appropriate indexes; and
- o Record the ERC use in the ERC Registry.

These tasks are described in the following sections. Although this chapter illustrates the recordkeeping for the use of an ERC in a bubble, the same recordkeeping tasks would be performed for uses of ERCs in netting or offsets.

## B. Logging the Receipt of Applications and Recording Progress

Agencies may record the receipt of applications to use ERCs and monitor progress in reviewing the application using either the capabilities of an existing permit tracking system or the Tracking Log explained in Chapter II of this manual. The Tracking Log is used to monitor applications to use ERCs in a manner similar to monitoring applications to receive credit for emission reductions. Exhibit V-1 illustrates a complete entry in the Tracking Log for the use by The Growing Business Company of its entire ERC.

C. Issuing Revised Certificates for Unused Portions of ERCs

When a firm uses less than the full amount of an ERC, the agency issues a revised certificate indicating the remaining balance. The certificate is prepared in a manner identical to that described in Chapter IV for issuing a revised certificate to sellers of ERCs. In the example bubble transaction for the Growing Business Company, a revised certificate is not issued because the entire quantity of ERCs entered on the certificate is used. However, the agency enters the use of the ERC on a file copy of the current certificate, as illustrated in Exhibit V-2.

D. Updating Entries for Revised Certificate in Appropriate Indexes

When a firm uses less than an entire ERC, no updating entries are required in the indexes of the prototype system. However, the use or sale of an entire ERC is recorded in the indexes to indicate that the referenced certificate for the ERC is no longer valid. Exhibit V-3 illustrates the entry for the Depositor Directory. Exhibit V-4 illustrates the entry for the Pollutant Index.

E. Recording the Use of ERCs in the ERC Registry

The use of an ERC requires a single entry in the ERC Registry. This entry is similar to the entry for recording a sale of an ERC on the seller's Registry page, and is illustrated by Exhibit V-5. Both the emission increase allowed under the bubble and the total amount of the ERC used are entered in the Registry. The agency may apply a bubble ratio of greater than 1:1 to a transaction. Both the emission increase and the ratio are listed in the Registry.

When a source uses ERCs in exchange for increased emissions through an offset, bubble or netting, many agencies will issue a new or revised operating permit reflecting the new emission limitation. To provide a cross-reference between the use of ERCs recorded in the prototype system and the new or revised permit, the permit number may be entered in the "ERC Usage and Trades" section of the appropriate Registry page. When several ERCs are used in a single bubble, offset or netting transaction, the permit number should be entered on every appropriate page. Agencies which utilize a unique numbering scheme for bubbles may record the bubble reference number in the Registry in addition to the relevant permit numbers.

EXHIBIT V-1

RECORDING AND TRACKING AN APPLICATION TO USE ERCS

# ERC APPLICATION TRACKING LOG

| | | | | |
|---|---|---|---|---|
| 1. | Source Name | The Growing Business Co. | 7. Decision | Bubble approved |
| 2. | Source Address | 999 South Capitol Street<br>Washington, D.C. 20003 | 8. Certificate No. | None issued |
| 3. | Application Type | ERC use in bubble | | |
| 4. | Point or Process | Boiler in widget plant | | |
| 5. | Agency Official | J. Pierce | | |
| 6. | Additional Information Requested | Modeling data<br>requested 6/22/81 | | |

## POLLUTANTS

| TRACKING MILESTONES | | TSP |
|---|---|---|
| 9. | Date Received | 6/12/81 |
| 10. | Date Applic. Complete | 7/7/81 |
| 11. | Public Comments or Internal Review | Public Comments |
| 12. | Closing Date For Comments | 8/7/81 |
| 13. | Date Sent to EPA* | 8/14/81 |
| 14. | Date EPA Response Rec'd * | 9/21/81 |
| 15. | Fee Billed ($) | $100.00 |
| 16. | Date Fee Billed | -- |
| 17. | Date Fee Paid | 6/12/81 |
| 18. | Date Action Taken | 8/20/81 |

*-Emission trade approved as SIP revision.

EXHIBIT V-2

RECORDING USE OF ERCS ON AGENCY'S FILE COPY OF CERTIFICATE

Agency Logo

[*Agency Name*]

## EMISSION REDUCTION CREDIT CERTIFICATE

Issued to: The Growing Business Company
Address: 999 South Capitol Street
Washington, D.C. 20003

Certificate No. 81-0003
Date Issued May 21, 1981

Pollutant TSP
Emission Credit Twenty (20) Tons per Yr.

For Source Location

Permit Reference
Point or Process

Expiration April 30, 1991

This certificate represents ownership of the above amount of emission reduction credits for the specified pollutant. The emission reduction was confirmed by [*Agency Name*]. See Permit [*permit reference number*]. Subject to the rules established by [*Agency Name*] for emission reduction credit banking and use, these credits may be used to meet requirements for a new source permit or to comply with emissions limits required in the [*State Name*] State Implementation Plan. Use of some or all of these credits to satisfy permit requirements is subject to the approval of [*Agency Name*] according to its rules, and is subject to the following specific restriction(s):

None

All emission reduction credits are subject to pro rata adjustment in the event of changes in national ambient air quality standards or modification of the State Implementation Plan. No credits may be transferred without the express approval of [*Agency Name*].

Ernest Workman

Ernest Workman
Air Pollution Control Officer

| FOR AGENCY USE ONLY | | | | |
|---|---|---|---|---|
| ERC Registry Page | 3 | ERCs of 20 TPY | [ ] Sold | |
| ERC Balance Forwarded from Cert. No. | | Certificate No. | [x] Used on 9/30/81 | |
| | | Certificate No. | | Issued for Balance |
| | | | | Issued to Buyer |

EXHIBIT V-3

RECORDING THE USE OR TRADE OF AN ENTIRE ERC

ERC DEPOSITOR DIRECTORY

SOURCE CODE _____ PARENT COMPANY Not Applicable

NAME The Growing Business Company

ADDRESS 999 South Capitol Street ADDRESS _____
Washington, D.C. 20003

CONTACT J. Pierce CONTACT _____

TELEPHONE 202-777-7777 TELEPHONE _____

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED |
|---|---|---|---|---|---|
| NUMBER | DATE | | NUMBER | DATE | |
| 81-0003 | 5/21/81 | 9/30/81 | | | |

EXHIBIT V-4

RECORDING THE USE OR TRADE OF AN ENTIRE ERC

ERC POLLUTANT INDEX

POLLUTANT TSP

| CERTIFICATE | | DATE ERCs ENTIRELY TRADED/USED | SOURCE NAME |
|---|---|---|---|
| NUMBER | DATE | | |
| 81-0001 | 4/30/81 | | Clean Products, Inc. |
| 81-0003 | 5/21/81 | 9/30/81 | The Growing Business Company |

AGENCY LOGO

# ERC REGISTRY

Page 3

## OWNERSHIP

Certificate No. 81-0003 Date May 21, 1981

Owner Name The Growing Business Company

Address 999 South Capitol Street
Washington, D.C. 20003

Contact J. Pierce

Telephone 202-777-7777

Original Owner ☐ Purchased ERCs ☒

## ERC ATTRIBUTES

ERCs Issued 20 (TPY)
(See current balance below)

Pollutant TSP

AQCR Washington, DC Metro

Expiration April 30, 1991

## ORIGINAL REDUCTION

Cert. No. 81-0001 Date 4/30/81 Particle Size 30 u

Source Name Clean Products Inc.

Address 1234 Industrial Park, Dr. Stack: Height 50 ft.
Washington, D.C. 20460 Diam. 3 ft.

UTM ____ PSD or NA NA Plume: Temp. ____

Permit No. 43-0624-2

Red. Date 1/5/81 Velocity ____

Red. Method Installation of precipitator

Hazardous Pollutants None Other ____

Seasonal Variation None

## ERC USAGE AND TRADES

| DATE | TYPE OF TRADE | PERMIT NUMBER | CERTIFICATE NUMBER FOR TRADED ERCs | COMMENTS | EMISSIONS INCREASE (TPY) | ADJUSTMENT RATIO OR % | ERCs WITHDRAWN (TPY) | BALANCE (TPY) 20 | CERTIFICATE NUMBER FOR BALANCE |
|---|---|---|---|---|---|---|---|---|---|
| 9/30/81 | Bubble | 45-1247-1 | | | 18 | 11% | 20 | -0- | |
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EXHIBIT V-5

RECORDING THE USE OF ERCS

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# VI. MAINTENANCE OF EMISSIONS BANKING RECORDS AND THE PREPARATION OF BANKING REPORTS

## A. Overview

Most of the recordkeeping activities of an emissions banking program correspond to the general processing of applications to create, trade or use ERCs. However, certain recordkeeping requirements are specific to the storage of ERCs over time. This chapter explains these requirements, and how agencies may also use the system to produce reports that would be useful to emissions banking program managers, participating firms and other organizations interested in the program.

## B. Recordkeeping For Policy Options Affecting the Maintenance of Emission Banking Records

### 1. Expiration of ERCs

Some agencies may elect to require that firms use ERCs within a specified period beginning with the date of issuance. As illustrated in previous chapters, where such a provision is applicable, the Emission Reduction Credit Certificate and ERC Registry can be designed to include the expiration date of an ERC. Agencies may search periodically either a certificate file or the Registry to identify expired ERCs. When an ERC expires, the expiration is recorded in the "ERC Usage and Trades" section of the appropriate Registry page as illustrated in Exhibit VI-1. The expiration of an ERC should also be recorded in the Depositor Directory and Pollutant Index.

It is suggested that agencies notify firms of ERCs approaching expiration at least one year prior to the expiration date.

### 2. Adjustment of Banked ERCs for SIP Revisions

Some agencies may choose to adjust ERCs in the emissions bank if a SIP revision calls for more stringent emission limitations for existing facilities. This adjustment is recorded on the appropriate Registry pages in the "ERC Usage and Trades" section as illustrated in the example in Exhibit VI-1. In addition, the certificates for adjusted ERCs are revised and reissued using the procedure for revising certificates for uses of ERCs.

### 3. Adjustment of Banked ERCs for Non-Compliance

When a source reduces its emissions to obtain an ERC and then fails to comply with the new emission limitation before the ERC is traded, an agency may choose to reduce those ERCs an amount equal to the excess emissions. This type of adjustment is recorded in the same manner used to record adjustments for SIP revisions.

## C. Preparation of Reports Using the Prototype System

The prototype system enables agencies to prepare several types of reports that would enable managers to readily review and evaluate the operation of an emissions banking and trading program, and also provide useful information to firms holding ERCs, and other interested organizations. This section describes several reports and how the system may be used to produce them. These reports should be produced only when they are needed, and should not be viewed as an additional recordkeeping requirement.

### 1. Reports for Program Managers

Although the ERC Registry and Tracking Log together provide extensive information about the status of banked ERCs and applications to create, trade and use ERCs, emissions banking program managers may find the following types of summary reports easier to use:

- Emissions Banking Application Status Report - This periodic summary report would extract from the Tracking Log all applications for which the review process has not been completed, or has been completed within a stated period of time. Applications of the same type (e.g., new ERC, trades and uses) would be grouped together. This report would use the format of the Tracking Log, or a format similar to that presented in Exhibit VI-2.

- Emissions Banking Application Exception Report - This periodic report would be nearly identical to the above Status Report, but would list only those applications for which the most recent milestone was not achieved within a specified number of days from either the date of the previous milestone or the date of receipt of the application.

- Banked ERC Summary - This report lists the total amount of ERCs available for use in each air quality control region (AQCR) for pollutants eligible for banking. The information needed to produce this report may be extracted from the Registry. Exhibit VI-3 provides a sample format.

Additional management reports may be produced as needed.

### 2. Reports for Owners of ERCs

Agencies may want to inform firms periodically of current ERC balances owned by the firm. Copies of pages from the Emissions Banking Registry may be used as "statements of account" for the emissions bank and sent to the appropriate firms. Statements should be sent for those ERCs having a positive balance at any time during the statement period. The Depositor Directory would enable an agency to easily identify the ERCs for which statements should be sent to each firm.

### 3. Reports for Other Interested Organizations

Although many agencies will permit interested organizations to examine the ERC Registry, some agencies may want to prepare a report to promote the banking program. A Report of Current Emission Reduction Credits would enable firms and economic development agencies to easily identify sources owning ERCs that may be available for purchase and use in an offset or bubble. Exhibit VI-4 provides a sample format for this type of report. All information needed to produce the report is contained in the ERC Registry.

AGENCY LOGO

# ERC REGISTRY

Page 1

## OWNERSHIP

Certificate No. 81-0001 Date April 30,198

Owner Name Clean Products, Inc.
Address 1234 Industrial Park Drive
Washington, D.C. 20460

Contact Mr. John Fitch
Telephone 202-999-9999

Original Owner ☒ Purchased ERCs ☐

## ERC ATTRIBUTES

ERCs Issued 50 (TPY)
(See current balance below)

Pollutant TSP
AQCR Washington, D.C. Metro
Expiration April 30, 1991

## ORIGINAL REDUCTION

Cert. No. 81-0001 Date 4/30/81 Particle Size 30 u
Source Name Same as owner
Address
Stack: Height 50 ft.
Diam. 3 ft.
UTM ____ PSD or NA ____ Plume: Temp. ____
Permit No. 43-0624-2
Red. Date 1/5/81 Velocity ____
Red. Method Installation of precipitator

Hazardous Pollutants None Other ____
Seasonal Variation None

## ERC USAGE AND TRADES

| DATE | TYPE OF TRADE | PERMIT NUMBER | CERTIFICATE NUMBER FOR TRADED ERCs | COMMENTS | EMISSIONS INCREASE (TPY) | ADJUSTMENT RATIO OR % | ERCs WITHDRAWN (TPY) | BALANCE (TPY) 50 | CERTIFICATE NUMBER FOR BALANCE |
|---|---|---|---|---|---|---|---|---|---|
| 5/21/81 | Sale | | 81-0003 | Price is $400 per TPY | | | 20 | 30 | 81-0001.1 |
| 11/2/81 | Adjust | 1981-1 | | Revised emission limitation for TSP, Coal-fired boilers | 3 | - | 3 | 27 | 81-0001.2 |
| 3/31/91 | Expire | | | Expiration of unused ERCs | 27 | - | 27 | -0- | |
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EXHIBIT VI-1
RECORDING THE EXPIRATION OF ERCs
AND ADJUSTMENTS FOR SIP REVISIONS

EXHIBIT VI-2

EMISSIONS BANKING APPLICATION STATUS REPORT

REPORT DATE: _____ AGENCY OFFICIAL: _____

| APPLICATION TYPE | DATE RECEIVED | SOURCE NAME | LAST MILESTONE ACHIEVED | MILESTONE DATE | NOTES |
|---|---|---|---|---|---|
| | | | | | |

EXHIBIT VI-3

(Date)

BANKED ERC SUMMARY

| AQCR | POLLUTANT | NUMBER OF CERTIFICATES | QUANTITY OF ERCS (TPY) |
|---|---|---|---|
| | | | |

EXHIBIT VI-4

AGENCY LOGO

(AGENCY NAME)

REPORT OF CURRENT EMISSION REDUCTION CREDITS

(DATE)

| AIR QUALITY CONTROL REGION | COMPANY NAME | CONTACT PERSON | TELEPHONE | TOTAL CREDITS (TONS PER YEAR) | | |
|---|---|---|---|---|---|---|
| | | | | VOC | TSP | $SO_2$ |
| | | | | | | |

For additional information please call [*Agency Official*] of the [*Agency Name*] at [*Agency Telephone*].

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# VII. KEY ISSUES IN DEVELOPING A COMPUTER-BASED EMISSIONS BANKING AND TRADING SYSTEM

## A. Overview

Although the prototype system described in this manual is designed for use as a manual recordkeeping system, the prototype's design may be used as the basis for developing an equivalent computer-based system. Agencies considering the development of an automated emissions banking and trading system should take into account the following issues:

- o Anticipated number of banking and trading transactions and resulting use of the system;
- o Comparative advantages of automated and manual banking and trading systems; and
- o Potential for integrating the banking and trading system with existing or proposed automated air program information systems (e.g., systems for existing source permits).

Other issues, such as computer resource requirements, selection of batch versus on-line operation, and system access and security features, are equally important. However, these issues are not unique to this type of system and, therefore, are not discussed in this manual.[1]

## B. Anticipated Number of Transactions and Resulting Use of the System

Most agencies currently operating emission banking and trading programs have not yet issued a large number of ERCs or been called on to process a large number of applications to create, trade or use ERCs. Implementation and use of the prototype as a manual recordkeeping system would adequately support most programs. Unless an agency anticipates recording significantly more than 100 legitimate emissions trading transactions annually, or has or will have an automated permits system, the development of an automated system for emissions trading would probably not be cost-effective.

## C. Comparative Advantages of Automated and Manual Banking and Trading Systems

For agencies anticipating a large number of transactions, an automated system offers several advantages over a manual system:

- o More efficient and accurate calculation of ERC balances for uses and trades of ERCs, and assignment of certificate numbers;

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[1] Several useful texts and articles concerning system automation decision-making and the system design process are listed in Appendix B.

- Better quality data resulting from less transcription of data to maintain the ERC Registry and system indexes;
- More flexible and efficient access to large volumes of data to produce various reports; and
- Potentially more efficient production of certificates that would otherwise be typed manually. Note, however, that word processing systems could be used to efficiently produce certificates for a manual system.

However, a manual system offers the following advantages:

- Much less expensive to implement;
- System users require minimal training;
- Timely access to information not dependent on computer availability; and
- Easier and less expensive to modify to reflect changes in program policy and procedures and new recordkeeping requirements.

D. Potential for Integrating the Banking and Trading System With Other Automated Air Program Information Systems

Some agencies may elect to fully integrate an emissions banking and trading recordkeeping capability with an existing permits or emissions inventory system. For some permit and emissions inventory systems, it may be relatively simple to modify the existing software to accommodate banking and trading, and far less expensive than to develop a stand-alone automated emissions banking and trading system. However, the software for some existing emissions inventory and permit systems may be relatively difficult and expensive to modify. Agencies wishing to develop an integrated automated system may find it cost-effective to add a banking and trading recordkeeping capability to an existing automated system only if major system enhancements or modifications to other components of the system are currently planned.

# APPENDIX A

## Documents Providing Additional Information On Emissions Trading

"Emissions Trading Policy Statement and Technical Issues Document," Federal Register, Vol. 47, p. 15076, April 7, 1982.

Brokering Emission Reduction Credits; A Handbook, U.S. Environmental Protection Agency, EPA-230/3-81-002, January 1981, National Technical Information Service (NTIS) #PB- 81214249. Contact NTIS, U.S. Department of Commerce, Springfield, Virginia, 22161.

"Controlled Trading: Policy Issues Papers," US EPA, EPA-203/3-81-004, NTIS #PB-81235046. Includes:

- "Puget Sound Emissions Banking Experience" and "An Emission Offset and Banking Regulation for the Puget Sound Region," B. Carson, Puget Sound Air Pollution Control Association, 1980.
- "Emissions Allocation: A Tool for Air Quality Planning and Implementation of Reasonable Further Progress," J. Bush and J. Lyders, Ventura County Air Pollution Control District, 1980.
- "Emissions Reductions from Shutdowns", C. Courant, US EPA, 1980.
- "Potential For Generating Emission Reduction Credits From Solar and Energy Conservation," C. McCoy, US EPA, June 1980.
- "Indirect Offsets," M. Weiss and D. Foster, US EPA, June 1981.

A Market Approach to Air Pollution Control Could Reduce Compliance Costs Without Jeopardizing Clean Air Goals, U.S. General Accounting Office, PAD-82-15, March 23, 1982.

E. Baker and P. Winslow, "Tax Considerations Related To The Creation, Financing, Banking, Use and Disposition Of ERCs In Emissions Trading Approaches To Air Pollution," Scribner, Hall, Thornburg and Thompson, EPA-230-01-82-001, January 1982.[1]

Forthcoming EPA documents [1]:

- The Bubble And Its Use With Emissions Banking
- Plant Managers Guide To The Bubble
- Model Generic Trading Rules
- Comparison Of State Generic Trading Rules
- Introduction To ERC Trading
- Guide To ERC Financing
- The "Taking" Issue As Related To ERCs

For additional information, please contact the Regulatory Reform Staff, U.S. Environmental Protection Agency, at (202) 382-2685.

[1] These documents wil be available from the National Technical Information Service.

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## APPENDIX B

### Useful References for Development of Automated Systems

Ephraim R. McLean and John V. Soden, Strategic Planning for MIS, John Wiley and Sons, 1977

John G. Burch, Jr., Felix R. Strater, and Gary Grudnitski, Information Systems: Theory and Practice, John Wiley and Sons, 1979

James A. Senn, Information Systems in Management, Wadsworth Publishing Company, Inc., 1978

Leonard I. Krauss, Computer-Based Management Information Systems, American Management Association, Inc., 1970

Tom DeMarco, Structured Analysis and System Specification, Prentice-Hall, Inc., 1979

The Diebold Group, Inc., Automatic Data Processing Handbook, McGraw-Hill, Inc., 1977

James Martin, Computer Data-Base Organization, Prentice-Hall, Inc., 1977

James Martin, Principles of Data-Base Management, Prentice-Hall, Inc., 1976

American Management Systems, Inc., A Guide to Systems Development